California Institute for Regenerative Medicine

Sequence-specific regulator Prdm14 safeguards mouse ESCs from entering extraembryonic endoderm fates.

Journal: Nat Struct Mol Biol

Publication Year: 2011

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PubMed link: 21183938

Funding Grants: Trithorax and Polycomb methyltransferase complexes in cell fate determination.

Public Summary:

Scientific Abstract:
Prdm14 is a PR-domain and zinc-finger protein whose expression is restricted to the pluripotent cells of the early embryo, embryonic stem cells (ESCs), and germ cells. Here, we show that Prdm14 safeguards mouse ESC (mESC) maintenance by preventing induction of extraembryonic endoderm (ExEn) fates. Conversely, Prdm14 overexpression impairs ExEn differentiation during embryoid body formation. Prdm14 occupies and represses genomic loci encoding ExEn differentiation factors, while also binding to and promoting expression of genes associated with mESC self-renewal. Prdm14-associated genomic regions substantially overlap those occupied by Nanog and Oct4, are enriched in a chromatin signature associated with distal regulatory elements and contain a unique DNA-sequence motif recognized by Prdm14 in vitro. Our work identifies a new member of the mESC transcriptional network, Prdm14, which plays a dual role as a context-dependent transcriptional repressor or activator.

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